Stoller
Grand Junction Office established 1959

299-W11-64 (A7306)
Log Data Report

Borehole Information:

Borehole: 299-W11-64 (A7306)			**Site:** 216-T-6 Crib		
Coordinates (WA State Plane)		**GWL (ft)[1]:** Not deep enough		**GWL Date:**	1/30/2003
North	**East**	**Drill Date**	**TOC[2] Elevation**	**Total Depth (ft)**	**Type**
136,668.69 m	567,205.65 m	Sept. 1947	218.135 m	77.7	Cable Tool

Casing Information:

Casing Type	Stickup (ft)	Outer Diameter (in.)	Inside Diameter (in.)	Thickness (in.)	Top (ft)	Bottom (ft)
Welded steel	4.25	8 9/16	7 15/16	0.3125	+4.25	75
The logging engineer measured the casing stickup using a steel tape. A caliper was used to determine the outside casing diameter. The caliper and inside casing diameter were measured using a steel tape. Measurements were rounded to the nearest 1/16 in. Casing thickness was calculated.						

Borehole Notes:

Borehole coordinates, elevation, and well construction information are from measurements by Stoller field personnel, HWIS[3], and Chamness and Merz (1993). Zero reference is the top of the 8-in. casing. A reference point survey "X" is located at the top of the casing stickup.

Logging Equipment Information:

Logging System:	Gamma 2A		**Type:** SGLS (35%)
Calibration Date:	9/2002	**Calibration Reference:**	GJO-2002-383-TAC
		Logging Procedure:	MAC-HGLP 1.6.5, Rev. 0

Spectral Gamma Logging System (SGLS) Log Run Information:

Log Run	**1**	**2/Repeat**			
Date	2/18/03	2/18/03			
Logging Engineer	Spatz	Spatz			
Start Depth (ft)	77.0	45.0			
Finish Depth (ft)	5.0	35.0			
Count Time (sec)	200	200			
Live/Real	R	R			
Shield (Y/N)	N	N			
MSA Interval (ft)	1.0	1.0			
ft/min	N/A[4]	N/A			
Pre-Verification	BA204CAB	BA204CAB			
Start File	BA204000	BA204073			
Finish File	BA204072	BA204083			

Log Run	1	2/Repeat			
Post-Verification	BA204CAA	BA204CAA			
Depth Return Error (in.)	0	0			
Comments	Fine-gain adjustment after files -057 and -066.	Fine-gain adjustment after file -075.			

Logging Operation Notes:

Zero reference was top of the 8-in. casing. Logging was performed with a centralizer installed on the sonde. Pre- and post-survey verification measurements for the SGLS employed the Amersham KUT (^{40}K, ^{238}U, and ^{232}Th) verifier with serial number 082.

Analysis Notes:

Analyst:	Sobczyk	Date:	03/26/03	Reference:	GJO-HGLP 1.6.3, Rev. 0

SGLS pre-run and post-run verification spectra were collected at the beginning and end of the day. The verification spectra were all within the control limits established on 12/05/2002. The peak counts per second (cps) at the 609-keV, 1461-keV, and 2615-keV photopeaks on the post-run verification spectra as compared to the pre-run verification spectra for each day were between 1 percent lower and 4 percent higher at the end of the day.

Log spectra for the SGLS were processed in batch mode using APTEC SUPERVISOR to identify individual energy peaks and determine count rates. Post-run verification spectra were used to determine the energy and resolution calibration for processing the data using APTEC SUPERVISOR. Concentrations were calculated in EXCEL (source file: G2AFEB03.xls). Zero reference was the top of the 8-in. casing. On the basis of Chamness and Merz (1993), the casing configuration was assumed to be one string of 8-in. casing to total log depth (77 ft). The casing correction factor was calculated assuming a casing thickness of 0.3125 in. This casing thickness is based upon the field measurement. Water and dead time corrections were not needed or applied to the data.

Log Plot Notes:

Separate log plots are provided for gross gamma and dead time, naturally occurring radionuclides (^{40}K, ^{238}U, and ^{232}Th), and man-made radionuclides. Plots of the repeat logs versus the original logs are included. In addition, a comparison log plot of man-made radionuclides is provided to compare the data collected in 1993 and 1995 by Westinghouse Hanford Company's Radionuclide Logging System (RLS) with SGLS data. For each radionuclide, the energy value of the spectral peak used for quantification is indicated. Unless otherwise noted, all radionuclides are plotted in picocuries per gram (pCi/g). The open circles indicate the minimum detectable level (MDL) for each radionuclide. Error bars on each plot represent error associated with counting statistics only and do not include errors associated with the inverse efficiency function, dead time correction, or casing correction. These errors are discussed in the calibration report. A combination plot is also included to facilitate correlation. The ^{214}Bi peak at 1764 keV was used to determine the naturally occurring ^{238}U concentrations on the combination plot rather than the ^{214}Bi peak at 609 keV because it exhibited slightly higher net counts per second.

Results and Interpretations:

^{137}Cs was the only man-made radionuclide detected in this borehole. ^{137}Cs was detected near the ground surface (5 ft through 7 ft) at a concentrations ranging from the MDL (0.2 pCi/g) to 0.5 pCi/g. ^{137}Cs was

detected at log depths of 27, 28, and 75 ft with concentrations near the MDL. After examination of the spectra at these depths, it was determined that there is no evidence of a photopeak at 662 keV. The reported occurrences are probably the result of statistical fluctuation.

Recognizable changes in the KUT logs occurred in this borehole. A change of 5 pCi/g or more in apparent ^{40}K concentrations occurs between 30 and 40 ft. This increase in ^{40}K concentrations may represent the transition from the coarse-grained sediments of the Hanford H1 to the finer grained sediments of the Hanford H2.

The plots of the repeat logs demonstrate reasonable repeatability of the SGLS data for the natural radionuclides (609, 1461, 1764, and 2614 keV).

Gross gamma logs from Fecht et al. (1977) (attached) indicate that the sediments surrounding this borehole only contained background amounts of gamma radiation from 1963 to 1976. The SGLS detected minor amounts of ^{137}Cs between 5 and 7 ft.

Comparison log plots of data collected in 1993 and 1995 by Westinghouse Hanford Company and in 2003 by Stoller are included. The 1993 and 1995 concentration data for ^{137}Cs are decayed to the date of the SGLS logging event in February 2003. In 2003, there appears to be less ^{137}Cs than can be explained by radioactive decay.

References:

Chamness, M.A., and J.K. Merz, 1993. *Hanford Wells*, PNL-8800, Pacific Northwest Laboratory, Richland, Washington.

Fecht, K.R., G.V. Last, and K.R. Price, 1977. *Evaluation of Scintillation Probe Profiles from 200 Area Crib Monitoring Wells*, ARH-ST-156, Atlantic Richfield Hanford Company, Richland, Washington.

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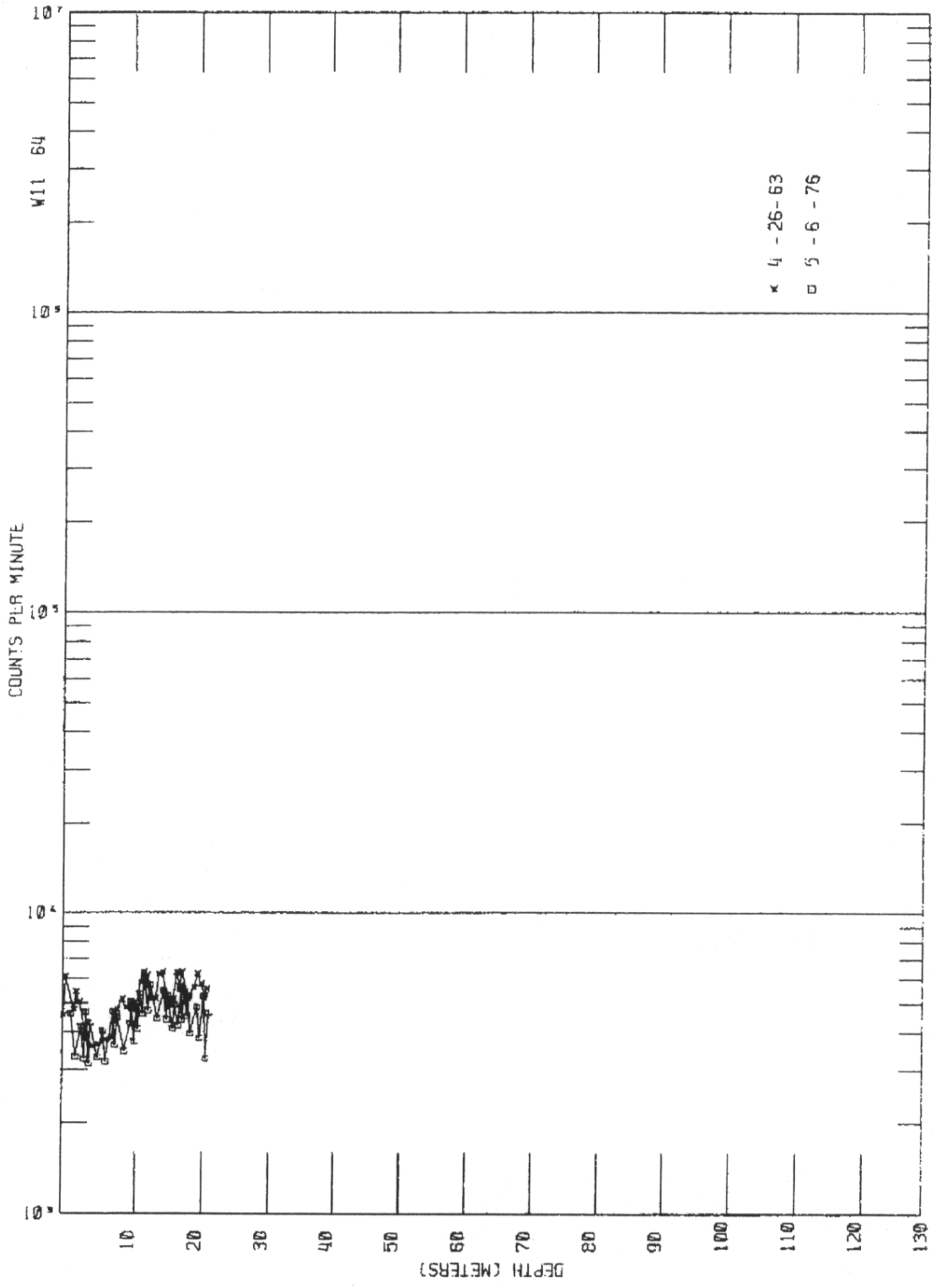
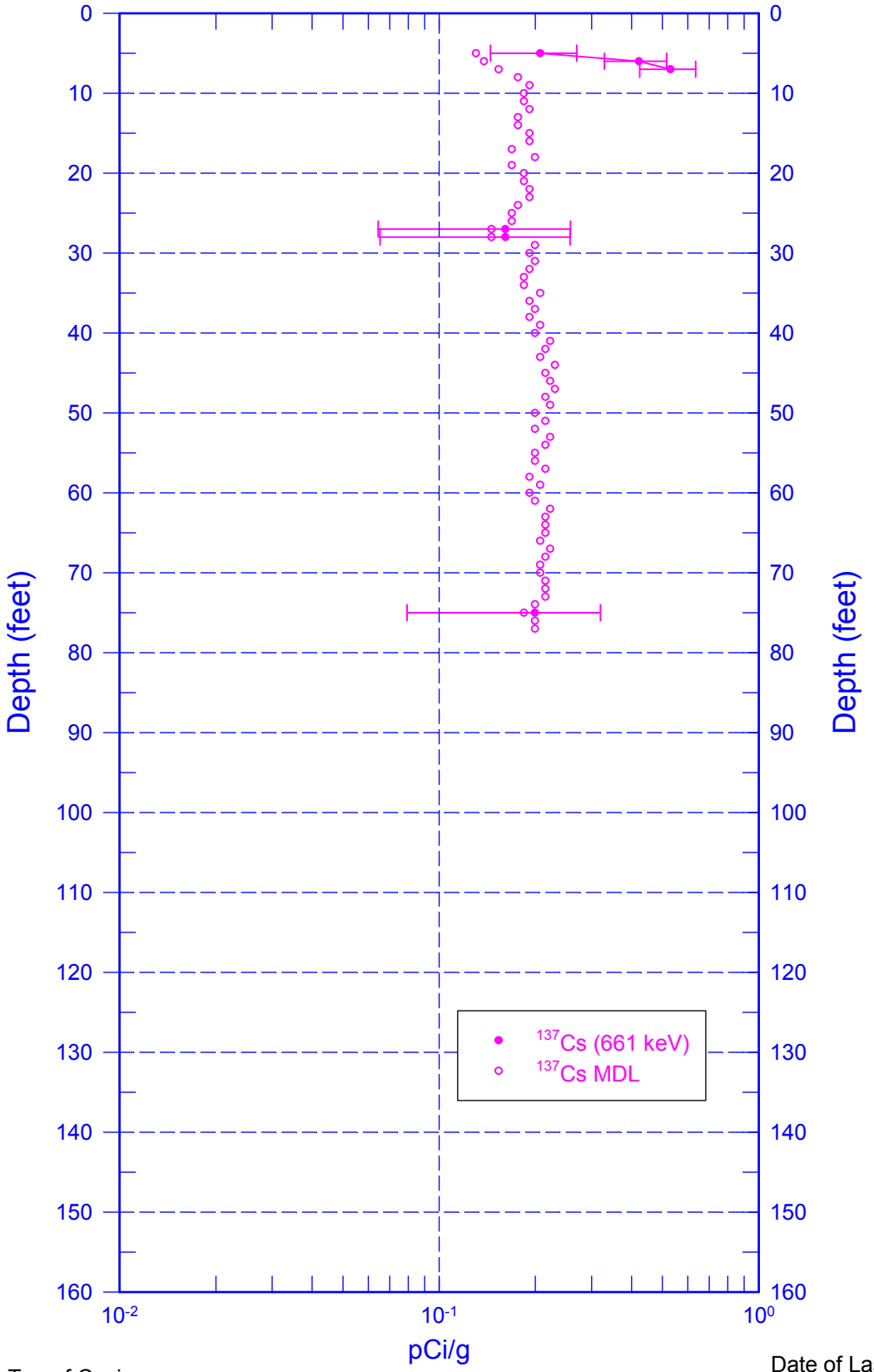
[1] GWL – groundwater level
[2] TOC – top of casing
[3] HWIS – Hanford Well Information System
[4] N/A – not applicable



from Fecht et al. (1977)

Scintillation Probe Profiles for Borehole 299-W11-64, Logged on 4/26/63 and 5/6/76

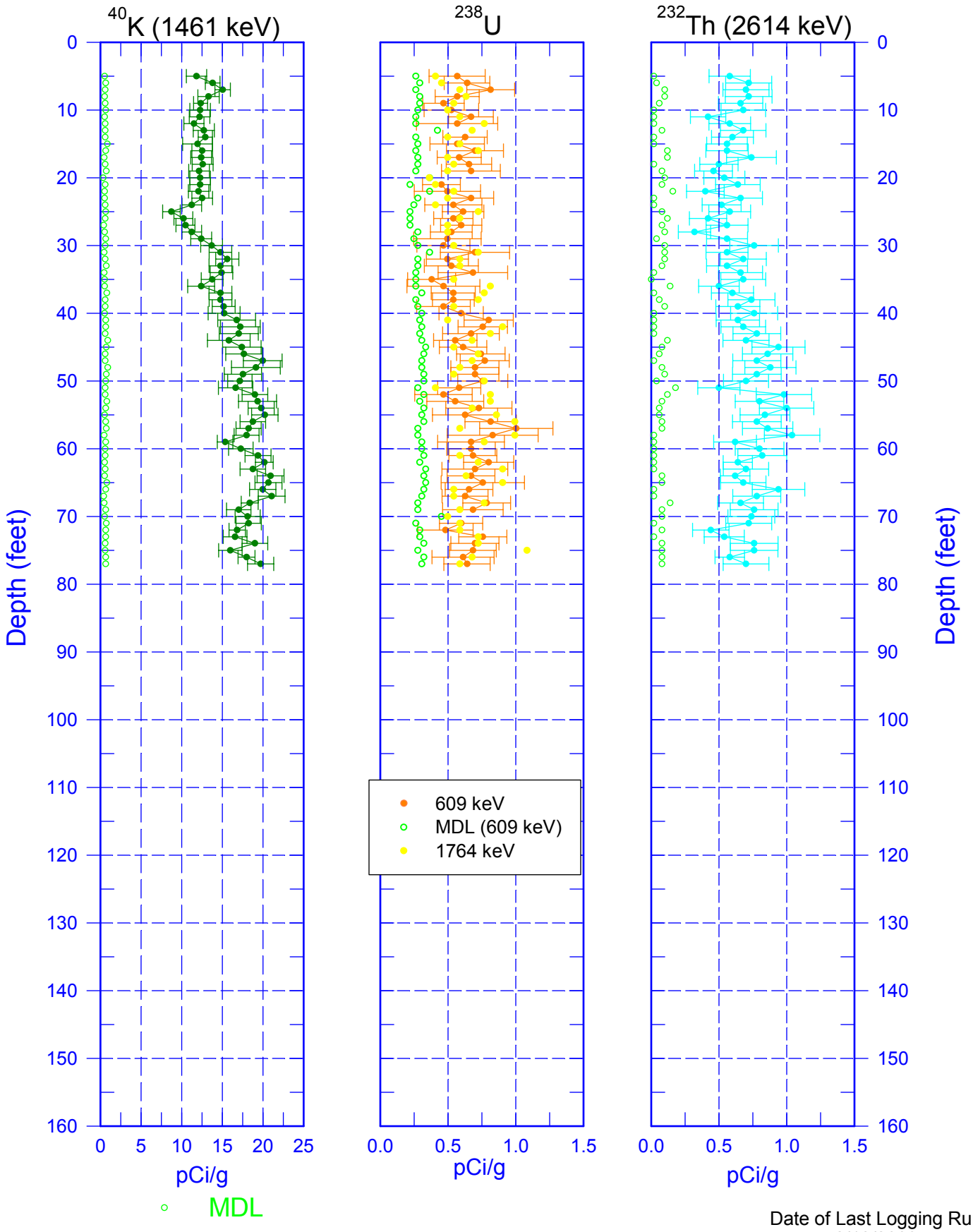
299-W11-64 (A7306)
Man-Made Radionuclides



Zero Reference = Top of Casing

Date of Last Logging Run
2/18/2003

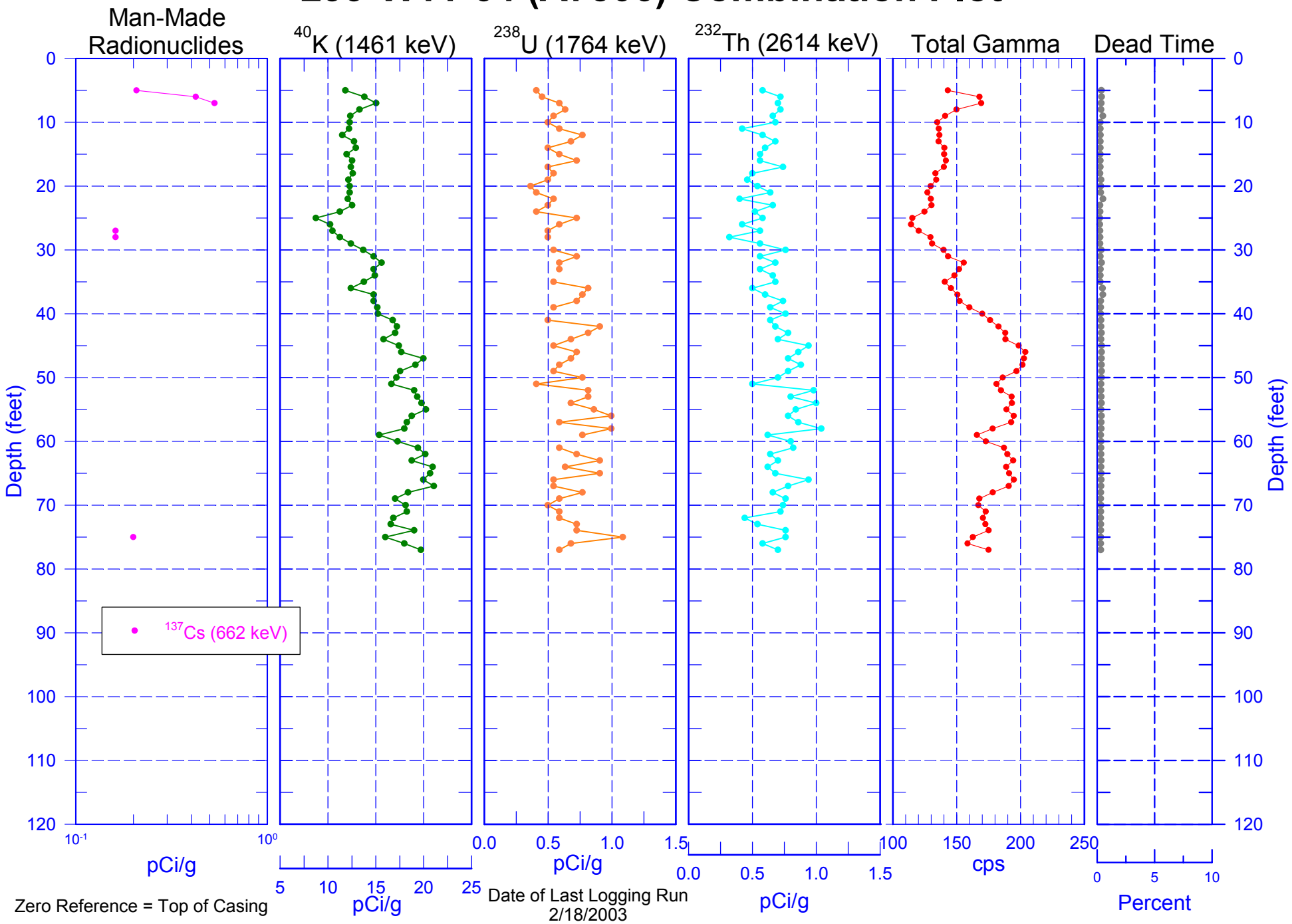
299-W11-64 (A7306)
Natural Gamma Logs



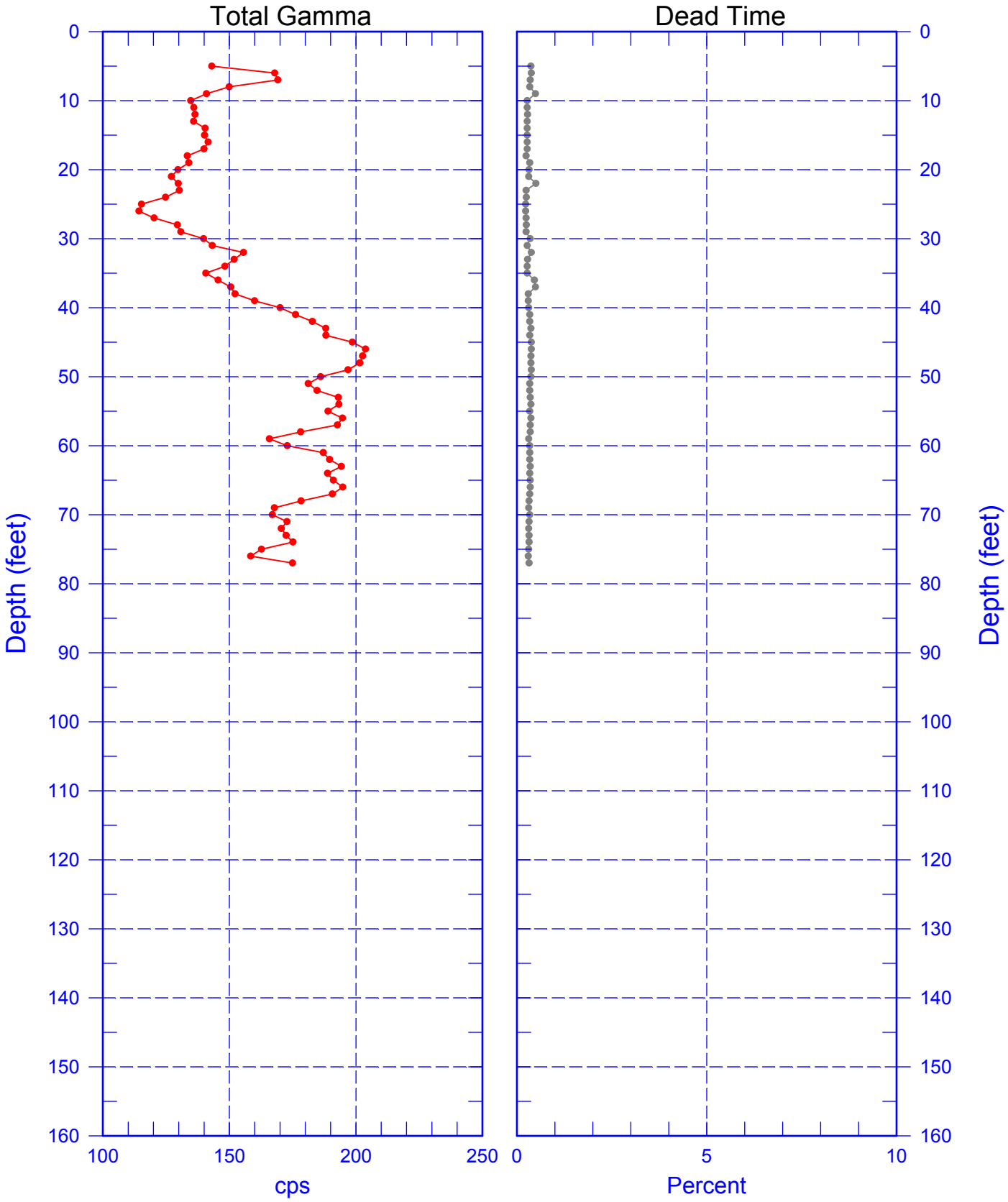
Zero Reference = Top of Casing

Date of Last Logging Run
2/18/2003

299-W11-64 (A7306) Combination Plot



299-W11-64 (A7306)
Total Gamma & Dead Time



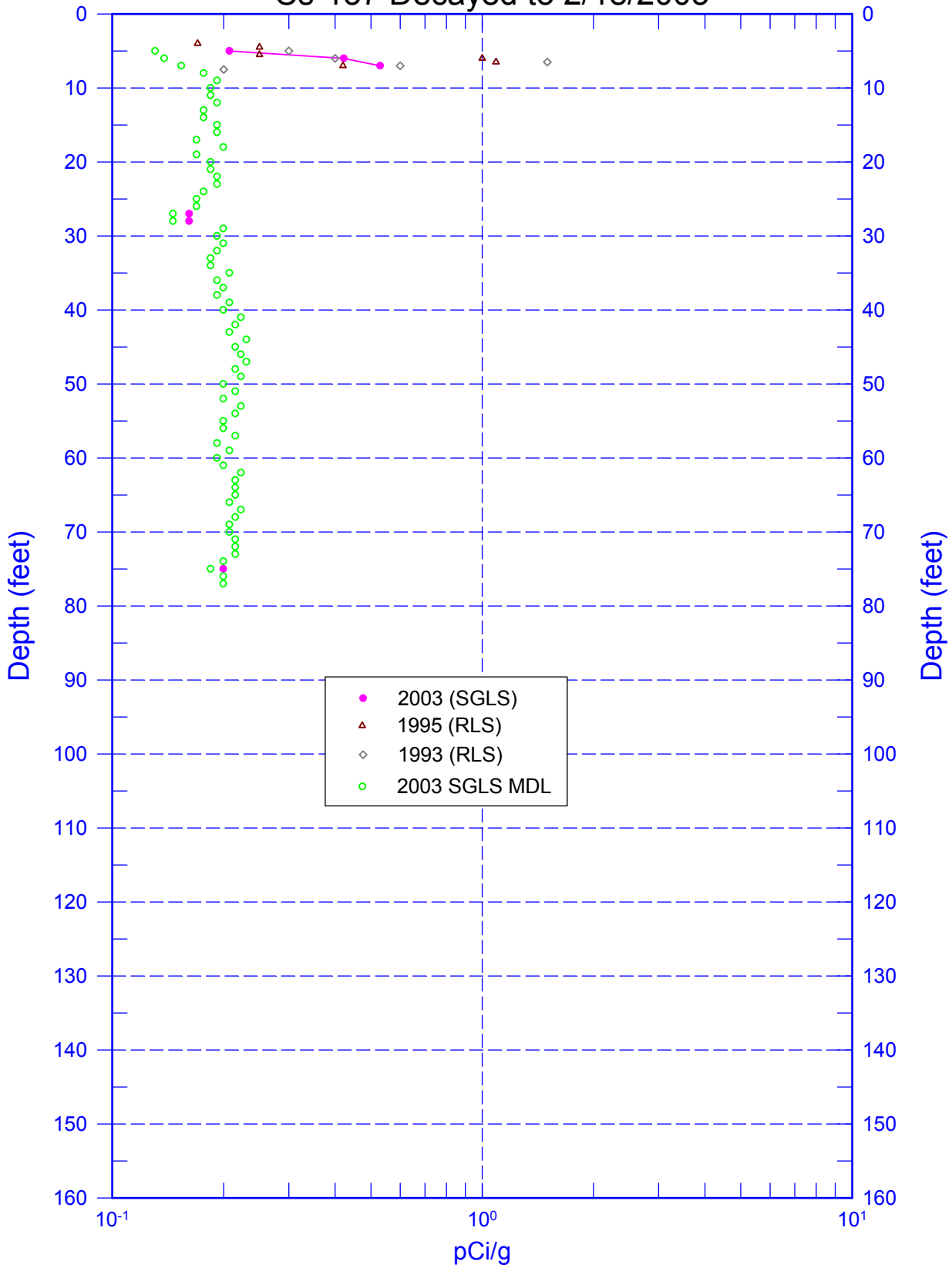
Zero Reference = Top of Casing

Date of Last Logging Run
2/18/2003

299-W11-64 (A7306)

RLS Data Compared to SGLS Data

Cs-137 Decayed to 2/18/2003



Zero Reference = Top of Casing (2003 SGLS & 1995 RLS)

1993 RLS Data Shifted +4 ft

299-W11-64 (A7306)

Rerun of Natural Gamma Logs (45.0 to 35.0 ft)